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Wu et al.

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(54) **CONTENT-BASED SECURITY PROCESSING USING DISTRIBUTED SCAN MANAGEMENT PROTOCOLS**

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(51) **Int. Cl.**

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H04N 1/32	(2006.01)
H04N 1/00	(2006.01)

(52) **U.S. Cl.**

CPC ***H04N 1/32545*** (2013.01); ***H04N 1/00838*** (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

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(Continued)

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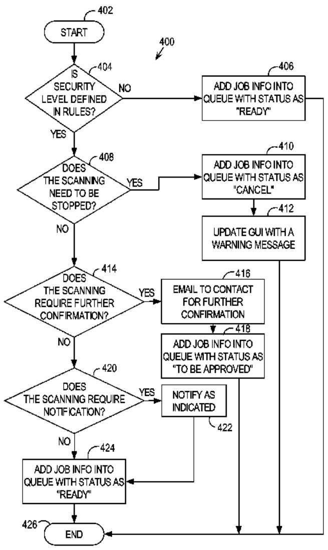
Assistant Examiner — Haris Sabah

(74) *Attorney, Agent, or Firm* — Hickman Palermo Becker Bingham LLP; Edward A. Becker

(57) **ABSTRACT**

A method and apparatus is provided for processing acquired document data, using distributed scan management protocols, according to a security classification of the data. A scanning device through which the document data is acquired includes a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol. In embodiments of the invention, the distributed scan device protocol and the distributed scan processing protocol are implemented using Web services. The distributed scan management service is configured to receive information for post scan processing instructions. The scanning device also includes a scan service configured to scan a document and generate scan data based on the document scan. The scanning device further includes a security handler service that is configured to identify a security classification for the scan data, and perform one or more actions, associated with the security classification, for the scan data.

17 Claims, 7 Drawing Sheets


402
START
400
404
IS SECURITY LEVEL DEFINED IN RULES?
NO
YES
406
ADD JOB INFO INTO QUEUE WITH STATUS AS "READY"
408
DOES THE SCANNING NEED TO BE STOPPED?
YES
NO
410
ADD JOB INFO INTO QUEUE WITH STATUS AS "CANCEL"
412
UPDATE GUI WITH A WARNING MESSAGE
414
DOES THE SCANNING REQUIRE FURTHER CONFIRMATION?
YES
NO
416
EMAIL TO CONTACT FOR FURTHER CONFIRMATION
418
ADD JOB INFO INTO QUEUE WITH STATUS AS "TO BE APPROVED"
420
DOES THE SCANNING REQUIRE NOTIFICATION?
YES
NO
NOTIFY AS INDICATED
422
424
ADD JOB INFO INTO QUEUE WITH STATUS AS "READY"
426
END

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Hameed: "Windows 7 / Windows Server, 2008, R2: Distributed Scan Management", dated Oct. 11, 2009, 4 pages.

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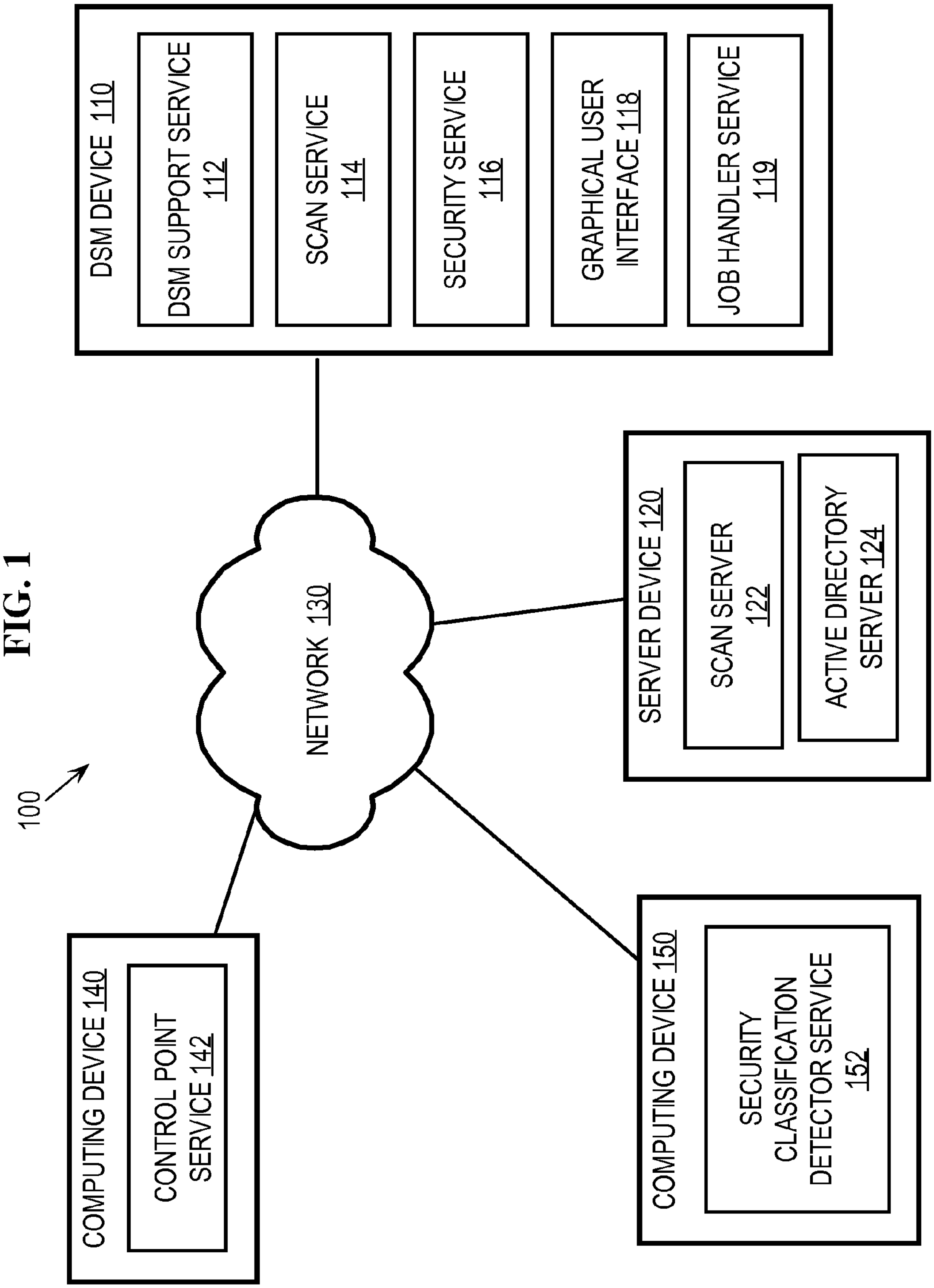
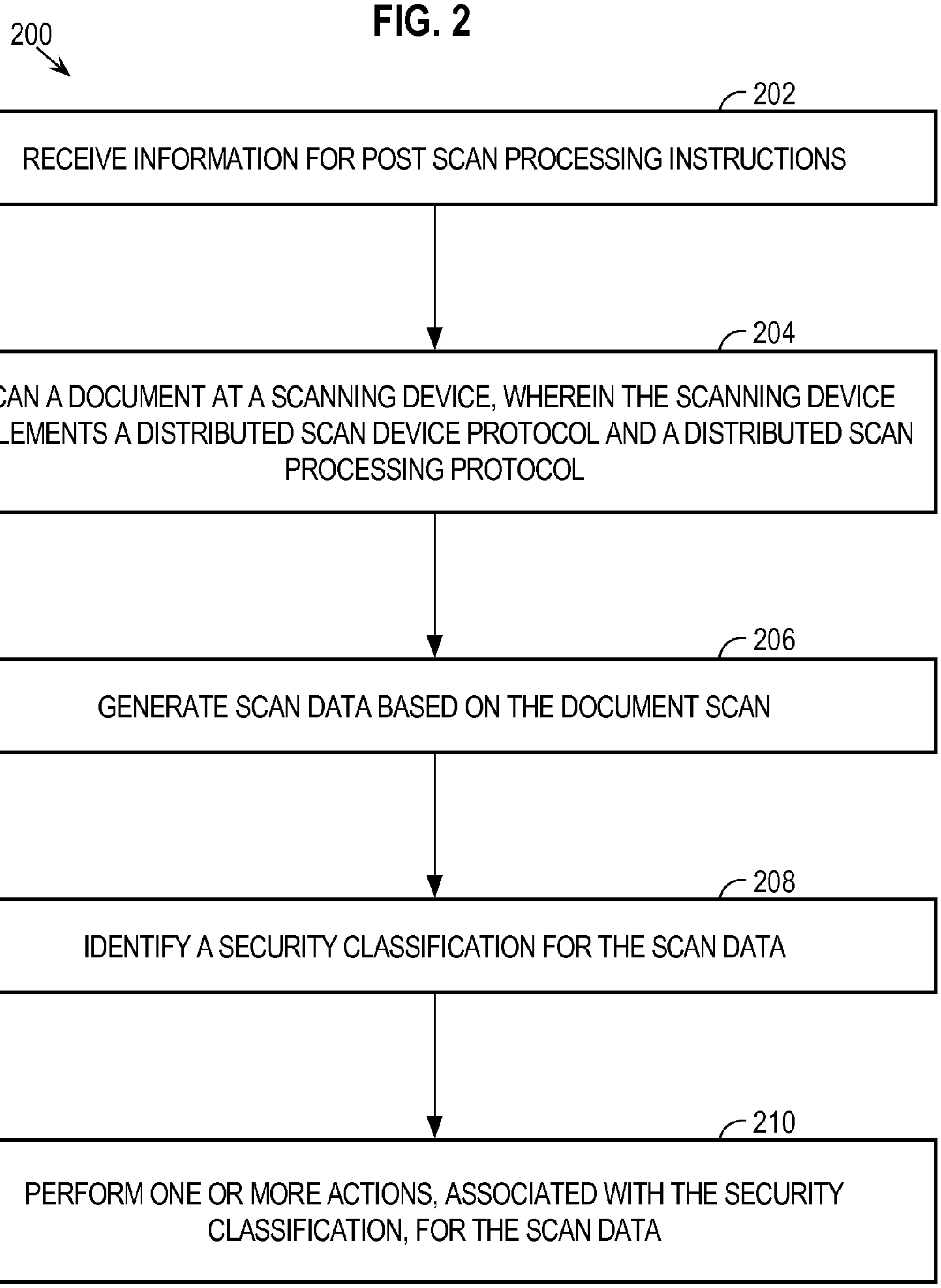

100
DSM DEVICE 110
DSM SUPPORT SERVICE 112
SCAN SERVICE 114
SECURITY SERVICE 116
GRAPHICAL USER INTERFACE 118
JOB HANDLER SERVICE 119
NETWORK 130
SERVER DEVICE 120
SCAN SERVER 122
ACTIVE DIRECTORY SERVER 124
COMPUTING DEVICE 140
CONTROL POINT SERVICE 142
COMPUTING DEVICE 150
SECURITY CLASSIFICATION DETECTOR SERVICE 152

FIG. 1

FIG. 2


200
202
RECEIVE INFORMATION FOR POST SCAN PROCESSING INSTRUCTIONS
204
SCAN A DOCUMENT AT A SCANNING DEVICE, WHEREIN THE SCANNING DEVICE IMPLEMENTS A DISTRIBUTED SCAN DEVICE PROTOCOL AND A DISTRIBUTED SCAN PROCESSING PROTOCOL
206
GENERATE SCAN DATA BASED ON THE DOCUMENT SCAN
208
IDENTIFY A SECURITY CLASSIFICATION FOR THE SCAN DATA
210
PERFORM ONE OR MORE ACTIONS, ASSOCIATED WITH THE SECURITY CLASSIFICATION, FOR THE SCAN DATA

300

FIG. 3

	Security code 330	Security Level 340	Security violation 350	Action 360	Action code 370	Action Parameters 380
312	001	Confidential	PSP contains external email	Email	1	It_admin@abc.com; communications@abc.com
314	002	Copyrighted		Email	1	It_admin@abc.com
316	003	Illegal		Stop	0	
318	004	Confidential		Email	1	It_admin@abc.com
320	005	Sensitive		Notify-Fax	2	555-222-1111

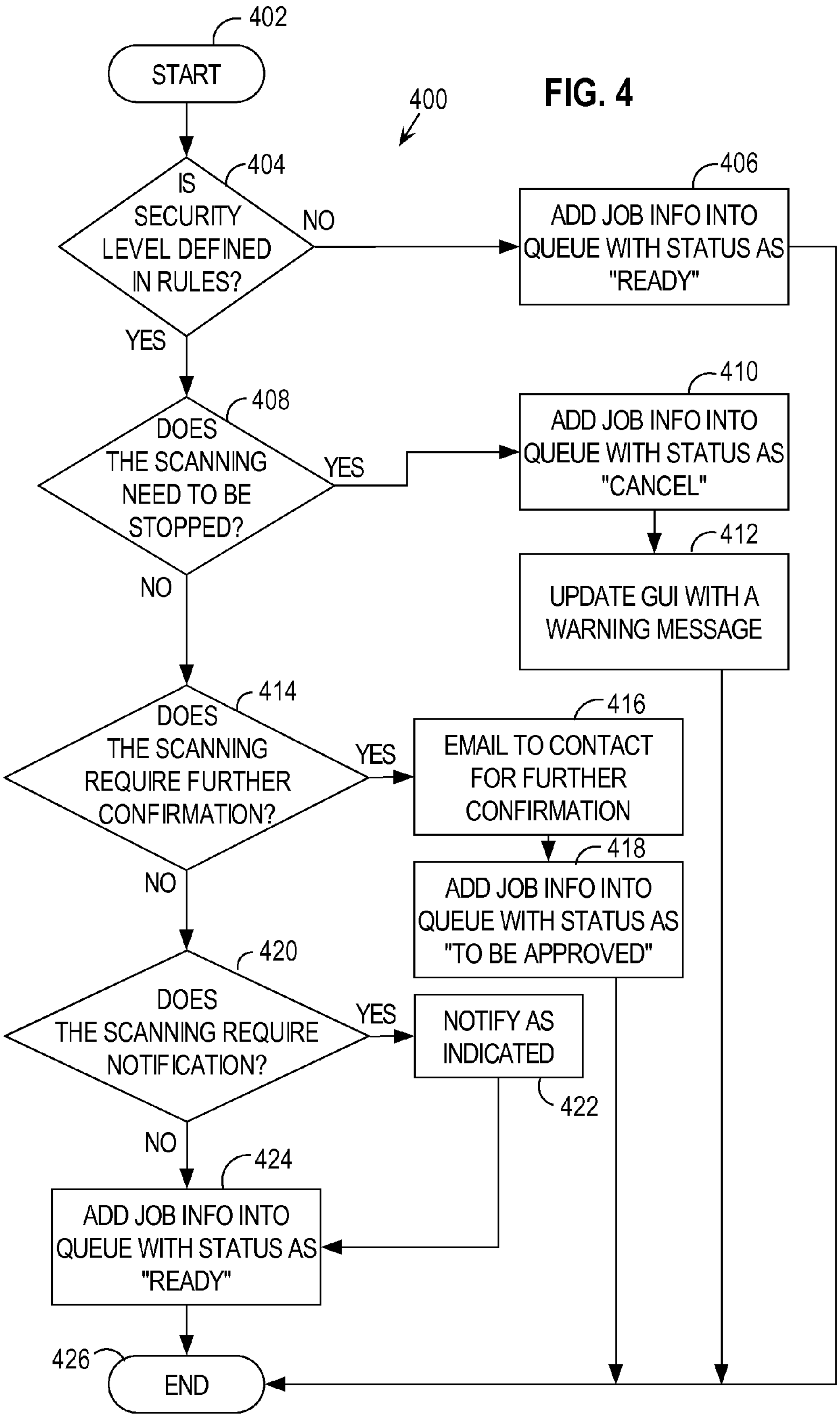
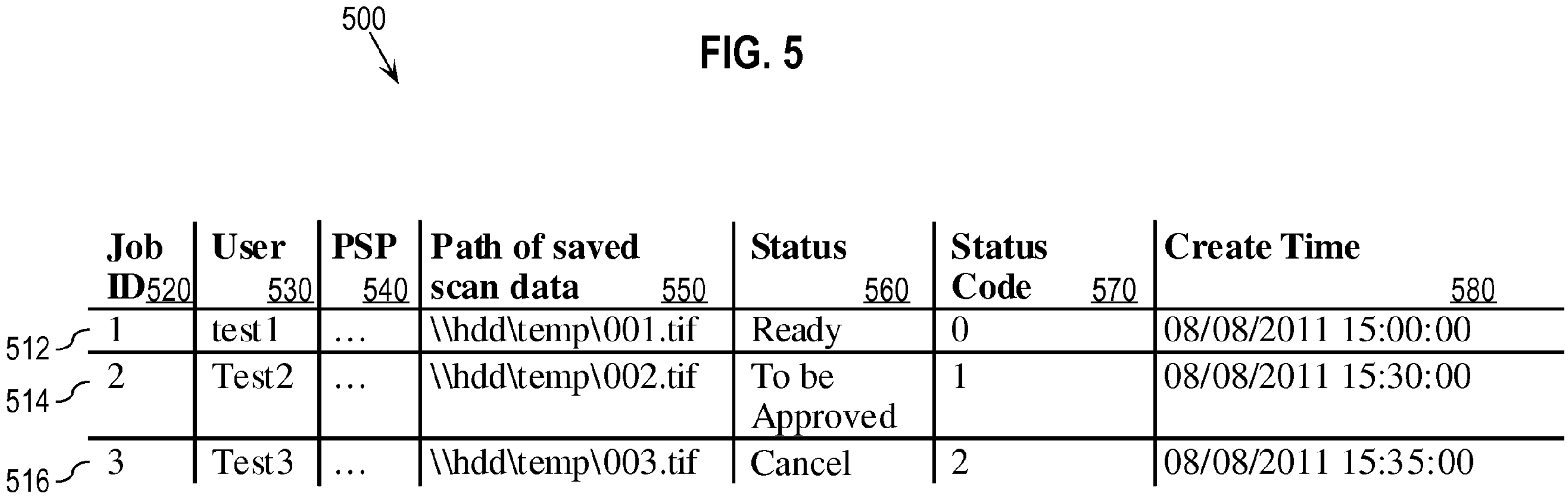

402
START
400
404
IS SECURITY LEVEL DEFINED IN RULES?
NO
406
ADD JOB INFO INTO QUEUE WITH STATUS AS "READY"
YES
408
DOES THE SCANNING NEED TO BE STOPPED?
YES
410
ADD JOB INFO INTO QUEUE WITH STATUS AS "CANCEL"
412
UPDATE GUI WITH A WARNING MESSAGE
NO
414
DOES THE SCANNING REQUIRE FURTHER CONFIRMATION?
YES
416
EMAIL TO CONTACT FOR FURTHER CONFIRMATION
418
ADD JOB INFO INTO QUEUE WITH STATUS AS "TO BE APPROVED"
NO
420
DOES THE SCANNING REQUIRE NOTIFICATION?
YES
NOTIFY AS INDICATED
422
NO
424
ADD JOB INFO INTO QUEUE WITH STATUS AS "READY"
426
END

FIG. 4


500
512
514
516

Job ID520	User 530	PSP 540	Path of saved scan data 550	Status 560	Status Code 570	Create Time 580
1	test1	…	\\hdd\temp\001.tif	Ready	0	08/08/2011 15:00:00
2	Test2	…	\\hdd\temp\002.tif	To be Approved	1	08/08/2011 15:30:00
3	Test3	…	\\hdd\temp\003.tif	Cancel	2	08/08/2011 15:35:00

FIG. 5

FIG. 6

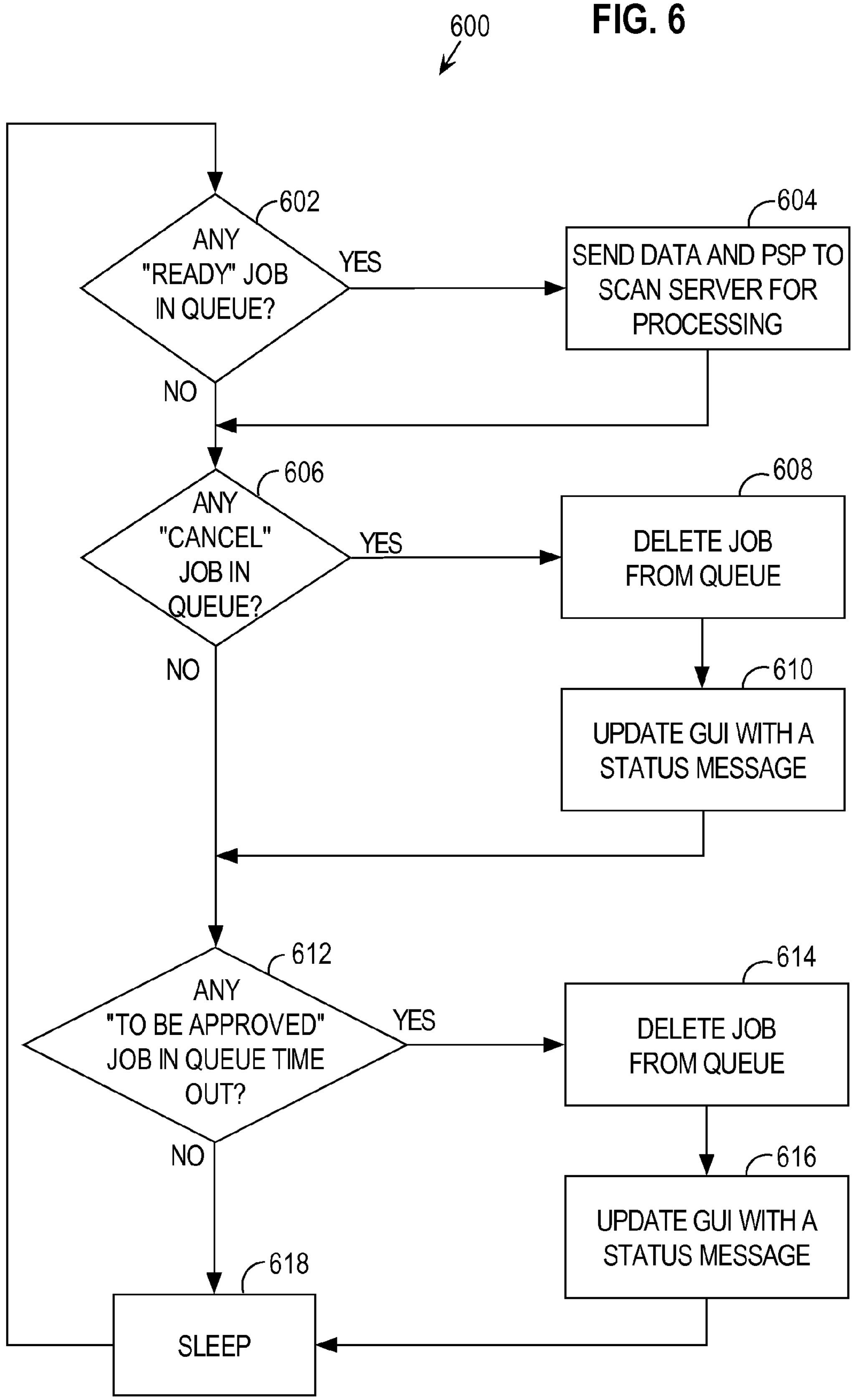
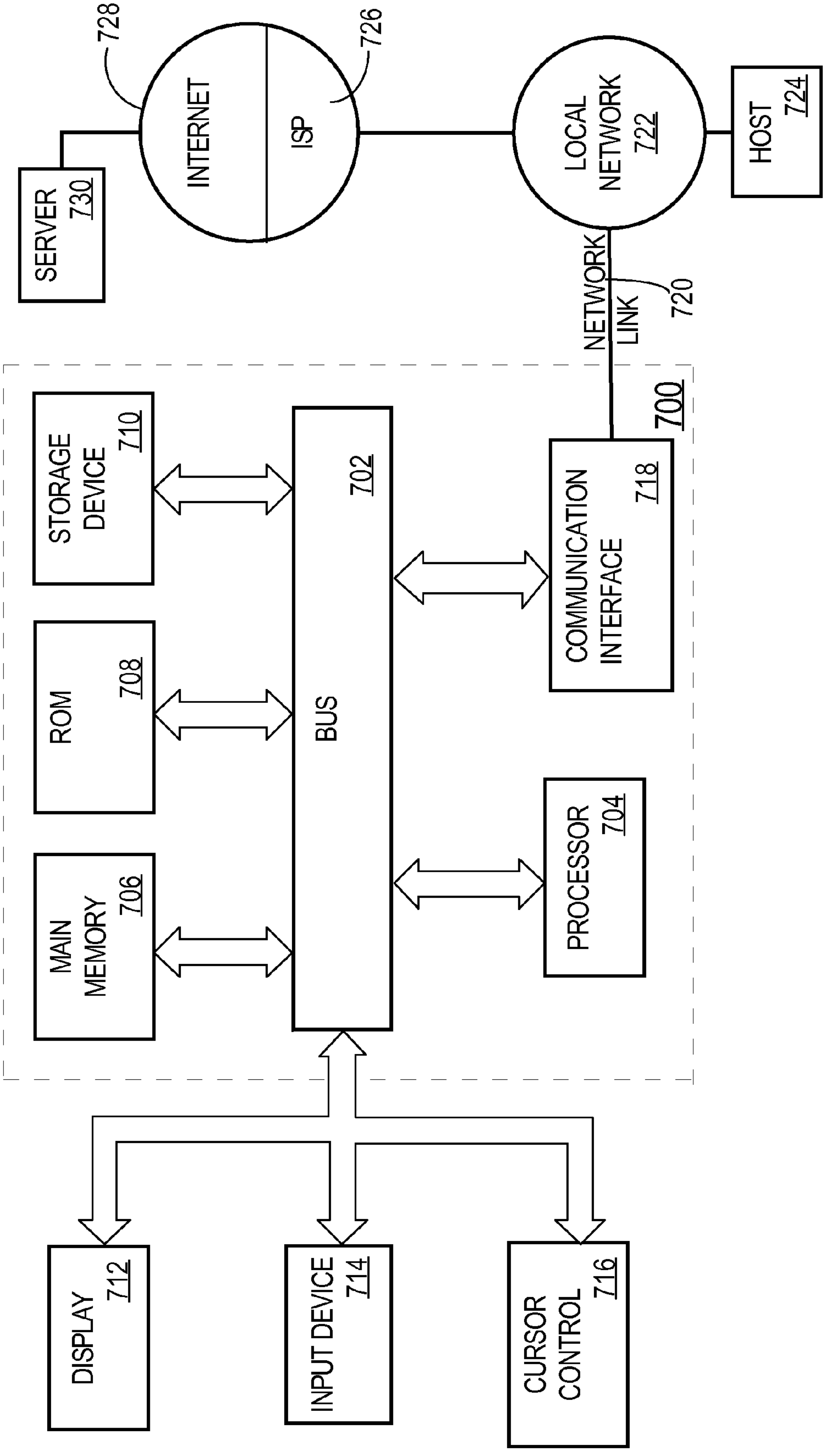

600
ANY "READY" JOB IN QUEUE?
602
YES
NO
SEND DATA AND PSP TO SCAN SERVER FOR PROCESSING
604
ANY "CANCEL" JOB IN QUEUE?
606
YES
NO
DELETE JOB FROM QUEUE
608
UPDATE GUI WITH A STATUS MESSAGE
610
ANY "TO BE APPROVED" JOB IN QUEUE TIME OUT?
612
YES
NO
DELETE JOB FROM QUEUE
614
UPDATE GUI WITH A STATUS MESSAGE
616
SLEEP
618

FIG. 7


SERVER
730
INTERNET
728
ISP
726
LOCAL NETWORK
722
HOST
724
NETWORK LINK
720
700
STORAGE DEVICE
710
ROM
708
MAIN MEMORY
706
BUS
702
COMMUNICATION INTERFACE
718
PROCESSOR
704
DISPLAY
712
INPUT DEVICE
714
CURSOR CONTROL
716

CONTENT-BASED SECURITY PROCESSING USING DISTRIBUTED SCAN MANAGEMENT PROTOCOLS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is related to U.S. patent application Ser. No. 13/398,704, filed Feb. 16, 2012, entitled "Additional Input Sources For Data Acquisition At Distributed Scan Management Systems". This application is also related to U.S. patent application Ser. No. 13/406,401, filed Feb. 27, 2012, entitled "Quotas In Distributed Scan Management Systems".

FIELD OF THE INVENTION

The present invention relates to controlling processing, of acquired document data by an enterprise scanning system, based at least in part on a security classification of the acquired document data.

BACKGROUND

An enterprise scanning system implements protocols that allow for entities to route documents that enter the system via a scanning device according to rules determined by system administrators and/or users of scanning devices. An example enterprise scanning system is Distributed Scan Management (DSM) implemented by Microsoft and deployed in Windows 7/Windows 2008 Server R2.

An enterprise scanning system that is implemented using DSM (a "DSM system") allows a user to authenticate user data via a DSM scanning device and to select from one or more sets of post scan processing instructions that are made available to the user. A set of post scan processing instructions (PSP) contains instructions for routing acquired documents, including one or more destinations to which acquired document data should be sent. For example, a PSP may indicate that acquired document data should be emailed to one or more email addresses, copied to one or more specified file servers, uploaded to one or more specified websites, etc. A PSP may also include, among other things, settings for data acquisition such as color style, acquisition resolution, file format type, etc.

After a user is authenticated and has selected a PSP, the user may introduce a document to the system, e.g., by scanning document data into the system at a DSM scanning device. The DSM system routes the acquired document data according to the selected PSP.

DSM systems process and disseminate acquired document data regardless of a security classification of the data, which may be inappropriate if there is a security issue with the acquired data. To illustrate, because scanning currency is illegal, there is a security issue when a user scans currency. In this situation, it would be more appropriate to delete the scanned currency data than to disseminate the scanned currency data according to the PSP selected by the user for the scan data. Thus, it would be advantageous for a DSM system to allow administrators to manage acquired document data according to a security classification of the data.

The approaches described in this section are approaches that could be pursued, but not necessarily approaches that have been previously conceived or pursued. Therefore, unless otherwise indicated, it should not be assumed that any of the approaches described in this section qualify as prior art merely by virtue of their inclusion in this section.

SUMMARY

An approach is provided for processing acquired document data based, at least in part, on a security classification of the data. A scanning device through which the document data is acquired includes a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol. In embodiments, the distributed scan device protocol and the distributed scan processing protocol are implemented using Web services. The distributed scan management service is configured to receive information for post scan processing instructions. The scanning device also includes a scan service configured to scan a document and generate scan data based on the document scan. The scanning device further includes a security handler service that is configured to identify a security classification for the scan data, and to perform one or more actions, associated with the security classification, for the scan data.

In embodiments, the security handler is further configured to add a job for the scan data into a job queue, which job includes information for the scan data. In such embodiments, the scanning device includes a job handler service configured to identify a status of the job in the job queue and perform one or more actions based on the status of the job. In further embodiments, the job handler service is configured to, responsive to identifying the status of the job as a ready status: cause the scan data and information for the post scan processing instructions to be sent to a scan server; and remove the job from the job queue. In further embodiments, the job handler service is configured to remove the job from the job queue responsive to identifying the status of the job as a cancel status.

Embodiments include the security handler service further configured to identify a particular security rule that is associated with the security classification and perform the one or more actions associated with the security classification based, at least in part, on the particular security rule. In embodiments, the security handler is further configured to request confirmation for processing the scan data, receive confirmation for processing the scan data, and change the status of the job in the job queue to reflect the confirmation for processing the scan data.

In a further embodiment, the security handler service is configured to identify two or more security rules that are associated with the security classification, and select the particular security rule, associated with an instruction included in the post scan processing instructions, from the two or more security rules.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a block diagram that depicts an example network arrangement for processing acquired document data based, at least in part, on a security classification of the data.

FIG. **2** illustrates a flowchart for detecting a security classification for scan data and performing one or more actions on the scan data based on the security classification.

FIG. **3** illustrates an example security table storing a set of security rules.

FIG. **4** illustrates a flowchart for performing one or more actions based on the rules in a security table.

FIG. **5** illustrates an example job queue.

FIG. **6** illustrates a flowchart for monitoring a job queue and dispatching jobs therein.

FIG. 7 is a block diagram of a computer system on which embodiments of the invention may be implemented.

DETAILED DESCRIPTION

In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent, however, that the present invention may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the present invention.

General Overview

An approach is provided for processing acquired document data based, at least in part, on a security classification of the data. A scanning device through which the document data is acquired includes a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol. In embodiments, the distributed scan device protocol and the distributed scan processing protocol are implemented using Web services. The distributed scan management service is configured to receive information for post scan processing instructions. The scanning device also includes a scan service configured to scan a document and generate scan data based on the document scan. The scanning device further includes a security handler service that is configured to identify a security classification for the scan data, and to perform one or more actions, associated with the security classification, for the scan data.

In embodiments, the security handler is further configured to add a job for the scan data into a job queue, which job includes information for the scan data. In such embodiments, the scanning device includes a job handler service configured to identify a status of the job in the job queue and perform one or more actions based on the status of the job. In further embodiments, the job handler service is configured to, responsive to identifying the status of the job as a ready status: cause the scan data and information for the post scan processing instructions to be sent to a scan server; and remove the job from the job queue. In further embodiments, the job handler service is configured to remove the job from the job queue responsive to identifying the status of the job as a cancel status.

Embodiments include the security handler service further configured to identify a particular security rule that is associated with the security classification and perform the one or more actions associated with the security classification based, at least in part, on the particular security rule. In embodiments, the security handler is further configured to request confirmation for processing the scan data, receive confirmation for processing the scan data, and change the status of the job in the job queue to reflect the confirmation for processing the scan data.

In a further embodiment, the security handler service is configured to identify two or more security rules that are associated with the security classification, and select the particular security rule, associated with an instruction included in the post scan processing instructions, from the two or more security rules.

A user administrator may manage processing of acquired document data based on security classifications of the data through definition of security rules. For example, a security rule may indicate that acquired document data with a first security classification requires email confirmation prior to processing the acquired document data. Further, a security rule may indicate that acquired document data with a second security classification must be cancelled without further processing the data. Thus, processing of acquired document data may be managed in an enterprise scanning system based on security classifications of the data.

Architecture for Processing Acquired Document Data

FIG. **1** is a block diagram that depicts an example network arrangement **100** for processing acquired document data based, at least in part, on a security classification of the data, according to embodiments. Network arrangement **100** includes a DSM device **110**, a server device **120**, and computing devices **140** and **150**, communicatively coupled via a network **130**. In example network arrangement **100**, DSM device **110** is configured to acquire document data, determine a security classification for the acquired data, and manage processing of the acquired data based, at least in part, on the security classification as described in further detail below.

DSM device **110** may be implemented by any type of device that is capable of acquiring document data and implementing a distributed scan device protocol and a distributed scan processing protocol. A description of a distributed scan device protocol may be found at "en-us/library/windows/hardware/ff540604%28v=VS.85%29.aspx" on the server "msdn.microsoft.com", the contents of which are incorporated by reference as if fully set forth herein. Further, a description of a distributed scan processing protocol may be found at "en-us/library/windows/hardware/ff540624%28v=VS.85%29.aspx" on the server "msdn.microsoft.com", the contents of which are also incorporated by reference as if fully set forth herein.

In example network arrangement **100**, DSM device **110** is configured with a DSM support service **112**, a scan service **114**, a security service **116**, a graphical user interface **118**, and a job handler service **119**. DSM device **110** may be configured with other mechanisms, processes and functionality, depending upon a particular implementation. The approaches described herein for processing acquired document data are not limited to any particular type of DSM device or network configuration. For example, implementations of DSM device **110** may include a scanning device and a multi-function peripheral (MFP) that performs any combination of printing, copying, facsimile, and scanning, etc. Any number of devices, including printing devices, scanning devices, client devices, administrative console devices, and other computing devices, may be included in the network.

DSM support service **112** may be implemented by one or more processes, and communicates with other applications and network devices. These communications include communications via (a) a distributed scan device protocol to communicate with a control point, e.g., control point service **142** of computing device **140**; and (b) a distributed scan processing protocol to communicate with a scan server, e.g., scan server **122** of server device **120**. In an embodiment, one or more of the protocols implemented by DSM support service **112** are performed using Web services. In an embodiment, all of the communications made by DSM device **110** is done using Web services. In these embodiments, DSM support service **112**, scan server **122**, Active Directory server **124**, and control point service **142** implement one or more Web services protocols such as WS-Discovery, WS-Eventing, and WS-MetadataExchange, described in more detail below.

Scan service **114** is implemented by one or more processes for acquiring document data via a scanning device at DSM device **110** or made available to DSM device **110**, e.g., via network **130**. Security service **116** is implemented by one or more processes configured to detect a security classification for acquired document data and perform one or more actions, associated with the security classification, for the document data, as described in further detail below. Job handler service **119** is implemented by one or more processes configured to manage and dispatch scan data jobs in a job queue, and is also described in further detail below. The services attributed to DSM device **110** in example network arrangement **100** are illustrative and the functions attributed to these services may be performed by any logical module at DSM device **110**.

DSM support service **112**, scan service **114**, security service **116**, and job handler service **119** may be implemented as resident processes on DSM device **110**. Alternatively, one more of DSM support service **112**, scan service **114**, security service **116**, and job handler service **119** may be made available to DSM device **110** on removable media or may be implemented at a remote location with respect to DSM device **110**. Also, DSM support service **112**, scan service **114**, security service **116**, and job handler service **119** may be implemented as plug-ins, or in hardware, software, or any combination of hardware or software, depending upon a particular implementation.

DSM device **110** is further configured with graphical user interface **118**. Graphical user interface **118** may be displayed at a display device associated with DSM device **110**. A display device may be a monitor, a screen on DSM device **110**, etc. Graphical user interface **118** may be implemented in a browser, as a stand-alone application, etc., and may be managed by any service at DSM device **110**.

Network **130** may be implemented with any type of medium and/or mechanism that facilitates the exchange of information between DSM device **110**, server device **120**, and computing devices **140** and **150**. Furthermore, network **130** may use any type of communications protocol, and may be secured or unsecured, depending upon the requirements of a particular embodiment.

Server device **120** may be implemented by any type of device that is capable of communicating with DSM device **110** and/or computing device **140** over network **130**. In example network arrangement **100**, server device **120** is configured with scan server **122** and Active Directory server **124**, described in further detail below. Server device **120** may be configured with other mechanisms, processes and functionality, depending upon a particular implementation. In embodiments, scan server **122** and Active Directory server **124** are implemented as resident processes on Server device **120**. In other embodiments, one or more of scan server **122** and Active Directory server **124** are made available to server device **120** on removable media or may be implemented at a remote location with respect to server device **120**. Also, scan server **122** and Active Directory server **124** may be implemented as plug-ins, or in hardware, software, or any combination of hardware or software, depending upon a particular implementation.

Computing devices **140** and **150** may be implemented by any type of computing device that is capable of communicating with DSM device **110** and/or server device **120** over network **130**. In example network arrangement **100**, computing device **140** is configured with control point service **142**, described in further detail below. Also in example network arrangement **100**, computing device **150** is configured with a security classification detector service **152** that may be utilized by security service **116** on DSM device **110**. In another embodiment, DSM device **110** is configured with a security classification detector service **152**. As such, descriptions herein of security classification detector service **152** may refer to either embodiment. Computing devices **140** and **150** may be configured with other mechanisms, processes and functionalities, depending upon a particular implementation.

DSM Communications and Data Processing Flow

DSM device **110** is considered to be a DSM-type device because DSM device **110**, via DSM support service **112**, communicates with control point service **142** using a distributed scan device protocol and with scan server **122** using a distributed scan processing protocol. In an embodiment, DSM support service **112** communicates with Active Directory server **124** via Lightweight Directory Access Protocol (LDAP).

Control point service **142** allows administrators to define PSPs and associate defined PSPs with one or more users or user groups. Control point service **142** causes information for the PSPs to be made accessible to Active Directory server **124**. For example, control point service **142** stores PSP information at memory for server device **120** that is accessible by Active Directory server **124**. In an embodiment, control point service **142** communicates with Active Directory server **124** via LDAP.

A user may input user authentication information (e.g., username and password) into graphical user interface **118** at DSM device **110**. DSM support service **112** authenticates the user information with Active Directory server **124**. Once the user is authenticated, DSM support service **112** retrieves a list of PSPs, which are available to the user, from Active Directory server **124** and displays the list to the user at graphical user interface **118**.

Through graphical user interface **118**, DSM support service **112** receives the user's selection of PSP of the list of PSPs, and the selected PSP is designated to be the processing instructions for document data that the user causes DSM device **110** to acquire. In an embodiment, the user scans a document at a scanning device for DSM device **110** and scan service **114** produces scan data for the document. However, embodiments of the invention are not limited to processing document data that is acquired via scanning. For example, DSM device **110** may acquire document data through electronic transfer of the data from a storage or computing device, through fax, or in any other manner. References herein to scan data do not limit the embodiments of the invention to acquiring data via scanning, but are used for ease of explanation.

Scan service **114** applies scan settings included in the selected PSP to document scans requested by the user. Also, if the selected PSP includes other data acquisition settings that are applicable to the manner of data acquisition used to acquire the document data, such settings are applied to the data acquisition. As described in further detail below, a component of DSM device **110**, e.g., DSM support service **112**, scan service **114**, security service **116**, job handler service **119**, etc., may send the scan data with the selected PSP to scan server **122**, which processes the scan data according to the selected PSP.

Web Services

The World Wide Web Consortium (W3C), which is an international consortium that develops standards for the World Wide Web, defines a "Web service" as a software system that is designed to support interoperable machine-to-machine interaction over a network. This definition encompasses many different systems, but in common usage, the term refers to those services that use Simple Object Access

Protocol (SOAP)-formatted Extensible Markup Language (XML) envelopes and that have interfaces described using Web Services Description Language (WSDL). Web services allow devices and applications to communicate with each other over one or more networks without the intervention of any human being, while using the same suite of protocols (e.g., Hypertext Transfer Protocol (HTTP)) that a human being would use to communicate with such devices and applications over the one or more networks.

SOAP is an XML-based, extensible message envelope format, with bindings to underlying protocols (e.g., HTTP and Simple Mail Transfer Protocol (SMTP)). Using XML, SOAP defines how messages should be formatted, so that those messages are formatted in such a way that the recipients of those messages (devices and applications) can understand the messages. SOAP can be used to perform remote procedure calls, for example.

WSDL is an XML format that allows Web service interfaces to be described along with the details of those interfaces' bindings to specific protocols. WSDL is typically used to generate server and client code, and for configuration.

Thus, common core specifications of Web services are SOAP, and WSDL, as well as WS-Discovery, WS-MetadataExchange, WS-Eventing, and WS-Addressing.

Processing Acquired Document Data Based on Security Classifications

Referring to FIG. **1**, once DSM device **110** has acquired the data to be processed, e.g., via scanning a document, security service **116** detects a security classification for the scan data and performs one or more actions on the scan data based, at least in part, on the security classification. FIG. **2** illustrates a flowchart for detecting a security classification for scan data and performing one or more actions on the data. At step **202**, information for post scan processing instructions are received. For example, DSM support service **112** receives a user's selection of a PSP as described above. In this example, the selected PSP includes instructions to send scan data to a particular destination for storage, to email the scan data to the authenticated user, and pre-defined scan settings that will cause scan service **114** to capture the content of the scan data as a black and white Portable Document Format (PDF) file. DSM support service **112** may receive information for a user's PSP selection before or after scan service **114** generates scan data based on the document scan.

At step **204**, a document is scanned at a scanning device, wherein the scanning device implements a distributed scan device protocol and a distributed scan processing protocol. Continuing with the previous example, the authenticated user requests DSM device **110** to scan a document provided to DSM device **110** by the user. In response to this request, DSM device **110** scans the document using any pre-defined scan settings in the selected PSP.

At step **206**, scan data is generated based on the document scan. For example, scan service **114** generates scan data based on the document scan performed at DSM device **110**. Such scan data may include one or more of an image of the scanned document, a reference to a storage location for an image of the scanned document, and other information for the scanned document. According to the previous example, scan service **114** stores an image of the scanned document as a black and white PDF file.

At step **208**, a security classification for the scan data is identified. For example, scan service **114** notifies security service **116** that scan data has been generated based on the document scan and is ready for a security classification. In one embodiment, security service **116** is associated with an Application Programming Interface (API). According to this embodiment, to notify security service **116** that scan data is ready for a security classification, scan service **114** calls an API function of security service **116** and passes the scan data to security service **116**.

In one embodiment, when security service **116** is notified of scan data that requires a security classification, security service **116** requests security classification detector service **152** to detect a security classification for the scan data. In connection with such a request, security service **116** may send scan data to security classification detector service **152**, or may send a reference to where the scan data is stored. Upon receipt of the request to classify scan data, security classification detector service **152** inspects the content of the scanned document represented in the scan data to determine a security classification for the scan data. After security classification detector service **152** has determined a security classification for the scan data, security classification detector service **152** returns the security classification to security service **116**.

The following are non-limiting examples of security classifications that may be detected by security classification detector service **152**, and bases for such detections. Security classification detector service **152** may assign a "Copyrighted" security classification to the scan data, e.g., based on a copyright notice in the content of the scanned document. Security classification detector service **152** may assign an "illegal" security classification to the scan data based on detecting that the content of the scanned document is not legal to scan, e.g., the content includes currency, or other bank notes. Furthermore, security classification detector service **152** may assign a "Confidential" security classification to the scan data, e.g., based on a watermark detected in the content of the scanned document, based on detecting that the scanned document contains an email, based on detecting that the scanned document is a legal-style document such as a contract, based on detecting that the scanned document includes a code that marks the document as confidential, etc.

At step **210**, one or more actions, associated with the security classification, are performed for the scan data. To illustrate, in response to receiving the scan data security classification, security service **116** retrieves a set of rules for performing actions on security-classified scan data. The set of rules may be stored as a security table, and is referred to as such for ease of explanation. In one embodiment, the one or more actions include inserting a job for the scan data into a job queue.

Security Table

FIG. **3** illustrates an example security table **300** storing non-limiting examples of security rules **312-320**. An administrator user may define the security rules in security table **300**, e.g., via graphical user interface **118**, or via an administrator control point such as control point service **142**. Security table **300** may be stored at DSM device **110**, or may be stored at a computing device accessible by DSM device **110**. In one embodiment, if security table **300** is stored at DSM device **110**, then only services of DSM device **110** access security table **300**. If security table **300** is stored at a computing device that is accessible to multiple DSM devices, then the rules defined in security table **300** may be used by multiple DSM devices having access the table.

Security rules **312-320** include security levels that derive from security classifications that may be returned by a security classification detector service (**152** of FIG. **1**) and one or more actions to be performed when a rule is mapped to scan data based, at least in part, on a security classification for the scan data. A security level may be derived from a security classification based on a security level table that maps security levels to security classifications returned by security classification detector service **152**. Furthermore, the name of a security level may be the same as the name of the corresponding security classification returned by security classification detector service **152**, and is thus derived from the security classification. In the embodiments described below, for ease of explanation, the name of a security level is the same as the name of the corresponding security classification.

In security table **300**, security code column **330** stores unique identifiers for security rules **312-320**. Security level column **340** stores security classifications associated with the various security rules **312-320**. Security violation column **350** stores further information identifying scan data (and/or a selected PSP) that should map to the various security rules **312-320**. Action column **360** stores identifiers of actions to be performed for scan data that maps to the various security rules **312-320**. Action code column **370** stores unique identifiers for associated actions indicated in action column **360**. Action parameters column **380** stores information that is needed for actions indicated in action column **360**. Security table **300** may include information not shown in FIG. **3** or may omit columns shown in FIG. **3**, depending upon a particular implementation.

FIG. **4** illustrates a flowchart for performing one or more actions based on security rules, such as security rules **312-320**. At step **402**, the flowchart begins. At step **404**, it is determined whether a security level derived from a security classification assigned to scan data is defined in the security rules. For example, security classification detector service **152** returns a security classification of “no classification” to security service **116** in connection with the scan data. Security service **116** determines that none of security rules **312-320** (FIG. **3**) in security table **300** are associated with a security level (column **340**) of “no classification”. Such a security classification may be assigned to the scan data because security classification detector service **152** detected no security issues with the contents of documents represented in the scan data.

Furthermore, the scan data maps to a security level included in one or more rules in security table **300**, but does not match the security violation information for any of the one or more rules with the appropriate security level (as described in further detail below), then it is considered that the security level for the scan data is not found in security table **300**.

Because the security classification returned by security classification detector service **152** is not associated with any security rule in security table **300**, control passes to step **406**, at which point job information is added into a job queue with a status as “Ready”. For example, security service **116** inserts a job for the scan data into a job queue for DSM device **110**, where the job has a “Ready” status.

FIG. **5** illustrates an example job queue table **500**. Job queue table **500** includes non-limiting examples of information that may be included in scan data jobs **512-516**. Job ID column **520** stores unique identifiers for the various scan data jobs **512-516**. User column **530** stores identifiers of a user that caused the various scan data jobs **512-516** to be included in job queue table **500**. PSP column **540** stores post scan processing instructions for the various scan data jobs **512-516**. PSP column **540** may store the post scan processing instructions, or may store a reference to where post scan processing instruction information is stored. Path of saved scan data column **550** stores references to where scan data associated with the various scan data jobs **512-516** are stored. Status column **560** stores the status of the various scan data jobs **512-516**. Status code column **570** stores a status code that uniquely identifies the associated status (column **560**). Create time column **580** stores timestamps that encode dates and times that the various scan data jobs **512-516** were created.

Continuing with the example given in connection with step **406**, security service **116** creates and inserts scan data job **512** into job queue table **500** with information for the scan data that received a security classification of “no classification”. After scan data job **512** is inserted into job queue table **500**, control passes to step **426** at which point flowchart **400** ends. Management of job queue table **500** and dispatch of the jobs therein is described in further detail below.

As another example to illustrate flowchart **400**, security classification detector service **152** returns a security classification of “illegal” to security service **116** in connection with the scan data. At step **404**, security service **116** identifies whether one or more of security rules **312-320** (FIG. **3**) are associated with the returned security classification. In the case of an “illegal” security classification, security service **116** identifies security rule **316** as having a security level (column **340**) of “illegal”. As there is a single security rule identified by the returned security classification, security service **116** maps the scan data to the identified security rule **316**. Control passes to step **408**.

At step **408**, it is determined whether the scanning needs to be stopped. For example, security service **116** determines that the action (column **360**) for security rule **316** is “Stop”, or action code (column **370**) “0”. Therefore, security service **116** determines that the scanning needs to be stopped, or in other words, the scan data cannot be processed as instructed by the user. Security service **116** may determine that other action types require the scanning to be stopped. For example, an action that may be included in action column **360**, “Stop/Email”, may require the scanning to be stopped and an email to be sent out with information about the scan, etc. Control passes to step **410** as a result of security service **116** determining that the scanning needs to be stopped.

At step **410**, job information is added into a job queue with a status as “Cancel”. For example, security service **116** creates scan data job **516** with a status of “Cancel” and with information for the scan data and inserts scan data job **516** into job queue table **500**.

After the scan data job **516** is inserted into job queue table **500**, control passes to step **412**, at which point a graphical user interface is updated with a warning message. For example, security service **116** causes graphical user interface **118** to display a message that indicates that the scan has been stopped. Such a message may include the security classification identified for the scan data (e.g., “Illegal”), and may include any other information, such as contact information for a person that the user may contact for assistance, an image for the scan data, etc. After security service **116** displays the warning message, control passes to step **426** at which point flowchart **400** ends.

As yet another example to illustrate flowchart **400**, security classification detector service **152** returns a security classification of “Copyrighted” to security service **116** in connection with the scan data. At step **404**, security service **116** identifies whether one or more of security rules **312-320** (FIG. **3**) are associated with the returned security classification. For example, security service **116** identifies security rule **314** having a security level (column **340**) of “Copyrighted”.

Since the security classification of the scan data is defined in security table **300**, control passes to step **408**, where it is determined whether the scanning needs to be stopped. Security service **116** determines that the action (column **360**) for security rule **314** is "Email", which is not associated with immediately stopping the scan process. Therefore, control passes from step **408** to step **414**.

At step **414**, it is determined whether the scanning requires further confirmation. Security service **116** determines that the action "Email" is an instruction to obtain confirmation of the scan data and associated PSP via email. As such, the scanning requires further confirmation and control passes to step **416**. Depending upon a particular implementation, other action codes may be associated with requiring further confirmation for a scanning, e.g., "Fax", "Email/Fax", "Telephone", etc., any of which may require confirmation for a scanning via any channel that may provide such a confirmation. To illustrate, an action "Telephone" may require an automated service to call a number included in action parameters column **380** with auditory information about the scan data. In the description herein, confirmation via email is used as an illustrative example and does not limit the embodiments of the invention thereto.

At step **416**, an email is sent to a contact for further confirmation. For example, in response to detecting that the action for security rule **314** is "Email", security service **116** sends an email with information about the scan data, and a request for confirmation to proceed with processing the scan data, to one or more email addresses included in the action parameters (column **380**) for security rule **314**. Such an email may include one or more of an image of the scan data, an identifier of the authenticated user associated with the scan data, the security classification that has been identified for the scan data, any identified security violation (column **350**), information for the associated PSP, etc. Information in action parameters column **380** may be labeled or unlabeled, depending upon a particular implementation.

At step **418**, job information is added into a job queue with a status as "To Be Approved". For example, security service **116** creates scan data job **514** with information for the scan data and inserts scan data job **514** into job queue table **500**. In one embodiment, after scan data job **514** is inserted into job queue table **500**, a graphical user interface is updated with a message indicating that confirmation for the scanning is being sought. For example, security service **116** causes graphical user interface **118** to display a message that indicates that processing the scan data has been delayed pending confirmation of the scanning. Such a message may include one or more of the security classification identified for the scan data (e.g., "Copyrighted"), contact information for a person that the user may contact for assistance, and any other information.

After security service **116** inserts a job for the scan data into the job queue, control passes to step **426** at which point flowchart **400** ends.

As yet another example to illustrate flowchart **400**, security classification detector service **152** returns a security classification of "Confidential" to security service **116** in connection with the scan data. At step **404**, security service **116** identifies whether one or more of security rules **312-320** (FIG. **3**) are associated with the returned security classification. In the case of a "Confidential" security classification, security service **116** identifies security rules **312** and **318** as having a security level (column **340**) of "Confidential".

In one embodiment, when multiple rules match the security classification of scan data, security service **116** maps, to the scan data, the first security rule that is identified in the security table as matching the information for the scan data. Depending upon a particular implementation, rules may be evaluated in ascending order of security code (column **330**). For a security rule to match information for scan data, both the security level (column **340**) and security violation information (column **350**) for the security rule must match the appropriate aspects of the scan data and associated information, such as the associated PSP, user information for the user that initiated the data acquisition, etc.

Security violation information for a security rule is information identifying aspects of the scan data and associated information, not involving security classifications, that further refines the mapping requirements of the security rule to the scan data. Security violation information may identify any aspect of scan data, PSP, associated user information, etc., that is not derived from a security classification, including one or more of particular destination information (from the PSP), a size of the scan data, a user identifier, and a user group to which the user belongs, etc.

According to this embodiment, security service **116** evaluates whether security rule **312** matches information for the scan data before evaluating security rule **318**. Security service **116** determines that security rule **312** includes security violation information (column **350**). The security violation information for security rule **312** indicates that scan data that maps to this security rule is associated with a PSP that contains an external email address. As such, security service **116** determines whether the PSP selected for the scan data contains an external email as a destination. If it does, then security rule **312** is mapped to the scan data.

If not, then security service **116** determines that security rule **312** does not map to the scan data and proceeds to the next security rule (**318**) that has the appropriate security level. Security service **116** determines that security rule **318** does not include security violation information and, thus, no further evaluation of security rule **318** is needed to map security rule **318** to the scan data.

In another embodiment, when multiple rules match the security classification of scan data, security service **116** first attempts to map, to the scan data, a security rule that matches the security classification of the scan data and also includes security violation information (column **350**). If there is no security rule with security violation information that maps to the scan data, then security service attempts to map, to the scan data, a security rule that matches the security classification of the scan data and that does not include security violation information. In this embodiment, a security rule that is more specifically tailored to the scan data via security violation information is given preference over a security rule that is more general.

For purposes of the example, security service **116** maps security rule **312** to the scan data. Since the security classification of the scan data is defined in security table **300**, control passes to step **408**, where it is determined whether the scanning needs to be stopped. Security service **116** determines that the action (column **360**) for security rule **312** is "Email", which is not associated with immediately stopping the scan process. Therefore, control passes from step **408** to step **414** and proceeds as describe above in connection with security rule **314**.

As yet another example to illustrate flowchart **400**, security classification detector service **152** returns a security classification of "Sensitive" to security service **116** in connection with the scan data. At step **404**, security service **116** identifies whether one or more of security rules **312-320** (FIG. **3**) are associated with the returned security classification. In the case of a "Sensitive" security classification, security service **116** identifies security rule **320** as having a security level (column **340**) of "Sensitive".

Since the security classification of the scan data is defined in security table **300**, control passes to step **408**, where it is determined whether the scanning needs to be stopped. Security service **116** determines that the action (column **360**) for security rule **320** is "Notify-Fax", which is not associated with immediately stopping the scan process. Therefore, control passes from step **408** to step **414**.

At step **414**, it is determined whether the scanning requires further confirmation. Security service **116** determines that the action "Notify-Fax" associated with security rule **320** does not require further confirmation prior to proceeding with processing the scan data. As such, control passes from step **414** to step **420**.

At step **420**, it is determined whether the scanning requires notification. Security service **116** determines that the action "Notify-Fax" associated with security rule **320** requires notification to a fax number in the action parameters (column **380**) for the rule. As such, the scanning requires notification and control passes to step **422**. Other actions may require notification at step **420**, including "Notify-Telephone", "Notify-Email", "Notify-Text", etc. Notifications may be sent in a manner similar to a confirmation request, described in further detail below, but do not include a mechanism to allow the recipient to confirm or deny processing the scan data.

At step **422**, notification is sent as indicated by the action for the security rule. For example, security service **116** sends a fax to the fax number in the action parameters (column **380**) for security rule **320**. The fax may include information about the scanning, including one or more of: an image of the scanned document; an identifier of the user that initiated the scan; information from the PSP associated with the scan; etc. However, because a "Notify-Fax" action does not require confirmation, no mechanism is provided to allow the recipient of the fax to confirm or deny processing of the scan data. Control then passes from step **422** to step **424**.

At step **424**, job information is added into a job queue with a status as "Ready". For example, security service **116** creates scan data job **512** with information for the scan data and inserts scan data job **512** into job queue table **500**. After security service **116** inserts a job for the scan data into the job queue, control passes to step **426** at which point flowchart **400** ends.

Job Handler Service

In one embodiment, job handler service **119** monitors job queue table **500** and executes actions associated with the status of the job. Job handler service **119** may be a distinct service in DSM device **110**, or may be part of security service **116**.

FIG. **6** illustrates a flowchart **600** for monitoring a job queue and dispatching jobs therein. At step **602**, it is determined whether any "Ready" job is in the queue. For example, in job queue table **500** (FIG. **5**), scan data job **512** has a status (column **560**) of "Ready". Since job queue table **500** includes at least one "Ready" job, control passes to step **604**.

At step **604**, the scan data and PSP associated with each of the one or more "Ready" jobs in the job queue are sent to a scan server for processing. Within embodiments of the invention, any service running on DSM device **110** may send information for the scan data and PSP to a scan server for processing, including Job handler service **119**, security service **116**, scan service **114**, DSM support service **112**, etc.

To illustrate one embodiment, job handler service **119** sends information for the scan data and PSP to scan server **122**. To illustrate another embodiment, job handler service **119** notifies DSM support service **112** of the "Ready" job. DSM support service **112** retrieves the information to be sent to scan server **122** for the "Ready" job and sends the information for the "Ready" job to scan server **122**. To illustrate yet another embodiment, job handler service **119** sends the scan data and PSP to DSM support service **112**, e.g., via an API call, which notifies DSM support service **112** of the "Ready" job and obviates the need for DSM support service **112** to retrieve the scan data information. DSM support service **112** sends the received scan data and PSP to scan server **122**. Scan server **122** processes the scan data and dispatches at least a portion of the scan data to the destinations defined in the accompanying PSP. When information for a job has been sent to the scan server, the job is deleted from the job queue.

If no jobs in the job queue have a "Ready" status, or after performance of step **604**, control passes to step **606**. At step **606**, it is determined whether any job in the job queue has a status of "Cancel". For example, scan data job **516** in job queue table **500** has a status (column **560**) of "Cancel". Since one or more jobs in job queue table **500** have a status of "Cancel", control passes to step **608** at which point the "Cancel" jobs are deleted from the job queue. For example, job handler service **119** deletes scan data job **516** from job queue table **500** without performing any other actions for the job.

At step **610**, a graphical user interface is updated with a status message. For example, job handler service **119** causes a message to be displayed at graphical user interface **118** indicating that the job has been cancelled. Such a message may include other information, including an image of the scan data, depending upon a particular implementation.

If there are no "Cancel" jobs in the job queue, or after performance of step **610**, control passes to step **612**. At step **612**, it is determined whether any job in the job queue with a status of "To Be Approved" has timed out. To illustrate, an administrator may set an amount of time that a job, which is pending approval (i.e., with a status of "To Be Approved"), may remain in the job queue. Once a job that is pending approval has been in the job queue for at least the allotted amount of time, the job is considered timed out. For example, job handler service **119** determines that scan data job **514** of job queue table **500** has a status "To Be Approved" and compares the amount of time that has passed since the job was created, as recorded in create time column **580**, with the amount of time that the job may be allowed to remain in the queue. If the job has exceeded this allotted amount of time, then the job has timed out and control passes to step **614**.

At step **614**, the job that has timed out is deleted from the job queue. For example, scan data job **514** is determined to have timed out and job handler service **119** deletes scan data job **514** from job queue table **500**.

At step **616**, a graphical user interface is updated with a status message. For example, job handler service **119** causes a message to be displayed at graphical user interface **118** indicating that scan data job **514** has timed out and has been deleted from the queue. Such a message may include information from the scan data and/or PSP selected for the scan data. Furthermore, an email may be sent to the user that originated the job to notify the user that the job timed out and been cancelled. If a job with a status of "To Be Approved" is not timed out, then the job remains in the job queue.

If no "To Be Approved" jobs in the job queue have timed out, or after performance of step **616**, control passes to step **618**. At step **618**, job handler service **119** sleeps for any amount of time, e.g., determined by an administrator, and then control automatically passes to step **602**.

Confirmation Requests

As previously indicated, when a job is placed in the job queue with a status of "To Be Approved", a communication is sent via the format indicated by the applicable security rule. For example, security rule **314** requires that a confirmation request email is sent to a contact indicated in the action parameters (column **380**) for the rule. The recipient of the confirmation request email may confirm or deny processing of the scan data via any method that allows the recipient to communicate the confirmation or denial to security service **116**. For example, the confirmation request email may include a voting mechanism whereby the recipient can communicate to security service **116** a "yes" to confirm processing the scan data or a "no" to deny processing the scan data. As another example, the recipient may respond to the confirmation request email with text that indicates the confirmation or denial, which text may be parsed by security service **116** or any other service. As yet another example, the confirmation request email may include hyperlinks or visual controls which, when activated, communicate a confirmation or denial of processing the scan data to security service **116**.

A security rule may require a confirmation request fax be sent to a fax number in the associated action parameters (column **380**). Such a fax may include an image of the scan data, the security classification associated with the scan data, etc. Again, the recipient of the confirmation request fax may confirm or deny processing of the scan data via any method that allows the recipient to communicate the confirmation or denial to security service **116**. For example, the recipient may fax a page with textual instructions to confirm or deny processing the scan data, which may be parsed by security service **116** or any other service.

A security rule may require a confirmation request telephone call be made to a telephone number in the associated action parameters (column **380**). As previously indicated, the confirmation request telephone call may be placed by an automated service and provide auditory information about the scan data. This auditory information may include the security classification of the data, an identifier of the user that caused the scan data to be acquired, etc. Again, the recipient of the confirmation request telephone call may confirm or deny processing of the scan data via any method that allows the recipient to communicate the confirmation or denial to security service **116**. For example, the recipient of the telephone call may confirm or deny of processing the scan data via pressing a particular button on the telephone corresponding to confirmation or denial. As another example, the telephone call recipient may speak a particular phrase to the automated service, which is translated into a confirmation or denial using voice recognition.

A security rule may require a confirmation request text message be sent to a telephone number in the associated action parameters (column **380**). The confirmation request text message may include a description of the security classification of the data, an identifier of the user that caused the scan data to be acquired, etc. The recipient of the confirmation request text message may confirm or deny processing of the scan data via any method that allows the recipient to communicate the confirmation or denial to security service **116**. For example, the recipient of the text message may confirm or deny of processing the scan data via a reply text message with the text "confirm" or "deny".

Furthermore, a security rule may require a confirmation request message be sent to an account identified in the associated action parameters (column **380**). Such an account may be a general-purpose social media account or a company-based social media account, etc. The confirmation request message may include a description of the security classification of the data, an identifier of the user that caused the scan data to be acquired, etc. The recipient of the confirmation request message may confirm or deny processing of the scan data via any method that allows the recipient to communicate the confirmation or denial to security service **116**. For example, the recipient of the message may confirm or deny of processing the scan data via a reply message with the text "confirm" or "deny". As another example, the confirmation request message may include hyperlinks or visual controls which, when activated, communicate a confirmation or denial of processing the scan data to security service **116**

Once security service **116** receives confirmation or denial of processing the scan data, then security service **116** changes the status of the associated job in the job queue to reflect a "Ready" status, or "Cancel" status, respectively. For example, security service **116** receives a confirmation of processing the scan data for scan data job **514** in job queue table **500**. Security service **116** changes the status (column **560**) and status code (column **570**) of scan data job **514** to a "Ready" status. The next time job handler service **119** checks for jobs with a status as "Ready", scan data job **514** will be processed accordingly.

As another example, security service **116** receives a denial of processing the scan data for scan data job **514** in job queue table **500**. Security service **116** changes the status (column **560**) and status code (column **570**) of scan data job **514** to a "Cancel" status. The next time job handler service **119** checks for jobs with a status as "Cancel", scan data job **514** will be deleted from job queue table **500** accordingly.

Hardware Overview

According to one embodiment, the techniques described herein are implemented by one or more special-purpose computing devices. The special-purpose computing devices may be hard-wired to perform the techniques, or may include digital electronic devices such as one or more application-specific integrated circuits (ASICs) or field programmable gate arrays (FPGAs) that are persistently programmed to perform the techniques, or may include one or more general purpose hardware processors programmed to perform the techniques pursuant to program instructions in firmware, memory, other storage, or a combination. Such special-purpose computing devices may also combine custom hard-wired logic, ASICs, or FPGAs with custom programming to accomplish the techniques. The special-purpose computing devices may be desktop computer systems, portable computer systems, handheld devices, networking devices or any other device that incorporates hard-wired and/or program logic to implement the techniques.

For example, FIG. **7** is a block diagram that illustrates a computer system **700** upon which an embodiment of the invention may be implemented. Computer system **700** includes a bus **702** or other communication mechanism for communicating information, and a hardware processor **704** coupled with bus **702** for processing information. Hardware processor **704** may be, for example, a general purpose microprocessor.

Computer system **700** also includes a main memory **706**, such as a random access memory (RAM) or other dynamic storage device, coupled to bus **702** for storing information and instructions to be executed by processor **704**. Main memory **706** also may be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor **704**. Such instructions, when stored in non-transitory storage media accessible to processor **704**, render computer system **700** into a special-purpose machine that is customized to perform the operations specified in the instructions.

Computer system **700** further includes a read only memory (ROM) **708** or other static storage device coupled to bus **702** for storing static information and instructions for processor **704**. A storage device **710**, such as a magnetic disk or optical disk, is provided and coupled to bus **702** for storing information and instructions.

Computer system **700** may be coupled via bus **702** to a display **712**, such as a cathode ray tube (CRT), for displaying information to a computer user. An input device **714**, including alphanumeric and other keys, is coupled to bus **702** for communicating information and command selections to processor **704**. Another type of user input device is cursor control **716**, such as a mouse, a trackball, or cursor direction keys for communicating direction information and command selections to processor **704** and for controlling cursor movement on display **712**. This input device typically has two degrees of freedom in two axes, a first axis (e.g., x) and a second axis (e.g., y), that allows the device to specify positions in a plane.

Computer system **700** may implement the techniques described herein using customized hard-wired logic, one or more ASICs or FPGAs, firmware and/or program logic which in combination with the computer system causes or programs computer system **700** to be a special-purpose machine. According to one embodiment, the techniques herein are performed by computer system **700** in response to processor **704** executing one or more sequences of one or more instructions contained in main memory **706**. Such instructions may be read into main memory **706** from another storage medium, such as storage device **710**. Execution of the sequences of instructions contained in main memory **706** causes processor **704** to perform the process steps described herein. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions.

The term "storage media" as used herein refers to any non-transitory media that store data and/or instructions that cause a machine to operation in a specific fashion. Such storage media may comprise non-volatile media and/or volatile media. Non-volatile media includes, for example, optical or magnetic disks, such as storage device **710**. Volatile media includes dynamic memory, such as main memory **706**. Common forms of storage media include, for example, a floppy disk, a flexible disk, hard disk, solid state drive, magnetic tape, or any other magnetic data storage medium, a CD-ROM, any other optical data storage medium, any physical medium with patterns of holes, a RAM, a PROM, and EPROM, a FLASH-EPROM, NVRAM, any other memory chip or cartridge.

Storage media is distinct from but may be used in conjunction with transmission media. Transmission media participates in transferring information between storage media. For example, transmission media includes coaxial cables, copper wire and fiber optics, including the wires that comprise bus **702**. Transmission media can also take the form of acoustic or light waves, such as those generated during radio-wave and infra-red data communications.

Various forms of media may be involved in carrying one or more sequences of one or more instructions to processor **704** for execution. For example, the instructions may initially be carried on a magnetic disk or solid state drive of a remote computer. The remote computer can load the instructions into its dynamic memory and send the instructions over a telephone line using a modem. A modem local to computer system **700** can receive the data on the telephone line and use an infra-red transmitter to convert the data to an infra-red signal. An infra-red detector can receive the data carried in the infra-red signal and appropriate circuitry can place the data on bus **702**. Bus **702** carries the data to main memory **706**, from which processor **704** retrieves and executes the instructions. The instructions received by main memory **706** may optionally be stored on storage device **710** either before or after execution by processor **704**.

Computer system **700** also includes a communication interface **718** coupled to bus **702**. Communication interface **718** provides a two-way data communication coupling to a network link **720** that is connected to a local network **722**. For example, communication interface **718** may be an integrated services digital network (ISDN) card, cable modem, satellite modem, or a modem to provide a data communication connection to a corresponding type of telephone line. As another example, communication interface **718** may be a local area network (LAN) card to provide a data communication connection to a compatible LAN. Wireless links may also be implemented. In any such implementation, communication interface **718** sends and receives electrical, electromagnetic or optical signals that carry digital data streams representing various types of information.

Network link **720** typically provides data communication through one or more networks to other data devices. For example, network link **720** may provide a connection through local network **722** to a host computer **724** or to data equipment operated by an Internet Service Provider (ISP) **726**. ISP **726** in turn provides data communication services through the world wide packet data communication network now commonly referred to as the "Internet" **728**. Local network **722** and Internet **728** both use electrical, electromagnetic or optical signals that carry digital data streams. The signals through the various networks and the signals on network link **720** and through communication interface **718**, which carry the digital data to and from computer system **700**, are example forms of transmission media.

Computer system **700** can send messages and receive data, including program code, through the network(s), network link **720** and communication interface **718**. In the Internet example, a server **730** might transmit a requested code for an application program through Internet **728**, ISP **726**, local network **722** and communication interface **718**.

The received code may be executed by processor **704** as it is received, and/or stored in storage device **710**, or other non-volatile storage for later execution.

In the foregoing specification, embodiments of the invention have been described with reference to numerous specific details that may vary from implementation to implementation. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. The sole and exclusive indicator of the scope of the invention, and what is intended by the applicants to be the scope of the invention, is the literal and equivalent scope of the set of claims that issue from this application, in the specific form in which such claims issue, including any subsequent correction.

What is claimed is:

1. A scanning device comprising:

a distributed scan management service that implements a distributed scan device protocol and a distributed scan processing protocol;

wherein the distributed scan management service is configured to receive information for post scan processing instructions;

a scan service configured to:

scan a document, and

generate scan data based on the document scan;

a security handler service configured to:

identify a security classification, for the scan data, based, at least in part, on at least a portion of the scan data;

identify two or more security rules that are applicable to the scan data based on an association of each of the two or more security rules with the security classification for the scan data;

wherein at least a particular security rule, of the two or more security rules, is associated with a security violation requirement;

determine that the security violation requirement, associated with the particular security rule, is satisfied by at least a portion of one or more of:

the scan data,

user data for a user that is associated with the scan data, or

the post scan processing instructions;

in response to determining that the security violation requirement associated with the particular security rule is satisfied, identify the particular security rule from the two or more security rules to apply to the scan data; and

in response to identifying the particular security rule, apply the particular security rule to the scan data by performing one or more actions for the scan data;

wherein the one or more actions are indicated by the particular security rule;

add a job for the scan data associated with the security classification into a job queue; and

wherein the job includes a status for the scan data associated with the security classification; and

a job handler service configured to:

identify the status of the job in the job queue; and

perform one or more actions based on the status of the job, comprising:

responsive to identifying the status of the job as a ready status:

cause the scan data and information for the post scan processing instructions to be sent to a scan server, and

remove the job from the job queue; and

responsive to identifying the status of the job as a cancel status:

remove the job from the job queue.

2. The scanning device of claim **1**, wherein adding the job for the scan data into the job queue is an action of the one or more actions indicated by the particular security rule.

3. The scanning device of claim **2**, wherein a second action of the one or more actions is requesting confirmation for processing the scan data, and wherein the security handler service is further configured to:

receive confirmation for processing the scan data; and

change the status of the job in the job queue to reflect the confirmation for processing the scan data.

4. The scanning device of claim **1**, wherein the security violation requirement for the particular security rule does not identify the security classification.

5. The scanning device of claim **4**, wherein the security violation requirement for the particular security rule identifies one or more of:

particular destination information in the post scan processing instructions,

a size of the scan data,

a user identifier, or

a user group to which the user belongs.

6. The scanning device of claim **1**, wherein the distributed scan device protocol and the distributed scan processing protocol are implemented using Web services.

7. One or more non-transitory computer-readable media storing instructions which, when processed by one or more processors, cause:

a distributed scan management service executing on a scanning device and:

implementing a distributed scan device protocol and a distributed scan processing protocol, and

receiving information for post scan processing instructions;

a scan service executing on the scanning device and:

scanning a document, and

generating scan data based on the document scan;

a security handler service executing on the scanning device and:

identifying a security classification, for the scan data, based, at least in part, on at least a portion of the scan data;

identifying two or more security rules that are applicable to the scan data based on an association of each of the two or more security rules with the security classification for the scan data;

wherein at least a particular security rule, of the two or more security rules, is associated with a security violation requirement;

determining that the security violation requirement, associated with the particular security rule, is satisfied by at least a portion of one or more of:

the scan data,

user data for a user that is associated with the scan data, or

the post scan processing instructions;

in response to determining that the security violation requirement associated with the particular security rule is satisfied, identifying the particular security rule from the two or more security rules to apply to the scan data; and

in response to identifying the particular security rule, applying the particular security rule to the scan data by performing one or more actions for the scan data;

wherein the one or more actions are indicated by the particular security rule;

adding a job for the scan data associated with the security classification into a job queue; and

wherein the job includes a status for the scan data associated with the security classification; and

a job handler service executing on the scanning device and:

identifying the status of the job in the job queue;

performing one or more actions based on the status of the job, comprising:

responsive to identifying the status of the job as a ready status:

causing the scan data and information for the post scan processing instructions to be sent to a scan server, and

removing the job from the job queue; and

responsive to identifying the status of the job as a cancel status:

removing the job from the job queue.

8. The one or more non-transitory computer-readable media of claim **7**, wherein: adding the job for the scan data into the job queue is an action of the one or more actions indicated by the particular security rule.

9. The one or more non-transitory computer-readable media of claim **8**, wherein a second action of the one or more actions is requesting confirmation for processing the scan data, and wherein the instructions further comprise instructions which, when processed by the one or more processors, cause the security handler service to:

receive confirmation for processing the scan data; and

change the status of the job in the job queue to reflect the confirmation for processing the scan data.

10. The one or more non-transitory computer-readable media of claim **7**, wherein the security violation requirement for the particular security rule does not identify the security classification.

11. The one or more non-transitory computer-readable media of claim **10**, wherein the security violation requirement for the particular security rule identifies one or more of:

particular destination information in the post scan processing instructions,

a size of the scan data,

a user identifier, or

a user group to which the user belongs.

12. The one or more non-transitory computer-readable media of claim **7**, wherein the distributed scan device protocol and the distributed scan processing protocol are implemented using Web services.

13. A computer-executed method comprising:

receiving information for post scan processing instructions;

scanning a document at a scanning device;

wherein the scanning device implements a distributed scan device protocol and a distributed scan processing protocol,

generating scan data based on the document scan;

identifying a security classification, for the scan data, based, at least in part, on at least a portion of the scan data;

identifying two or more security rules that are applicable to the scan data based on an association of each of the two or more security rules with the security classification for the scan data;

wherein at least a particular security rule, of the two or more security rules, is associated with a security violation requirement;

determining that the security violation requirement, associated with the particular security rule, is satisfied by at least a portion of one or more of:

the scan data,

user data for a user that is associated with the scan data, or

the post scan processing instructions;

in response to determining that the security violation requirement associated with the particular security rule is satisfied, identifying the particular security rule from the two or more security rules to apply to the scan data, and

in response to identifying the particular security rule, applying the particular security rule to the scan data by performing one or more actions for the scan data;

wherein the one or more actions are indicated by the particular security rule;

adding a job for the scan data associated with the security classification into a job queue;

wherein the job includes a status for the scan data associated with the security classification;

identifying the status of the job in the job queue;

performing one or more actions based on the status of the job, comprising:

responsive to identifying the status of the job as a ready status:

causing the scan data and information for the post scan processing instructions to be sent to a scan server, and

removing the job from the job queue; and

responsive to identifying the status of the job as a cancel status:

removing the job from the job queue.

14. The computer-executed method of claim **13**, wherein adding the job for the scan data into the job queue is an action of the one or more actions indicated by the particular security rule.

15. The computer-executed method of claim **14**, wherein a second action of the one or more actions is requesting confirmation for processing the scan data, and wherein the method further comprises:

receiving confirmation for processing the scan data; and

changing the status of the job in the job queue to reflect the confirmation for processing the scan data.

16. The computer-executed method of claim **13**, wherein the security violation requirement for the particular security rule does not identify the security classification.

17. The computer-executed method of claim **16**, wherein the security violation requirement for the particular security rule identifies one or more of:

particular destination information in the post scan processing instructions,

a size of the scan data,

a user identifier, or

a user group to which the user belongs.

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